

## **SUN SCREEN FOR A MOTOR VEHICLE**

### **REFERENCE TO RELATED APPLICATIONS**

- [1] The present invention claims the benefit of German Patent Application No. 102 44 156.1, filed September 23, 2002.

### **TECHNICAL FIELD**

- [2] The invention relates to an assembly made up of a roof module for a motor vehicle and a sun screen device.

### **BACKGROUND OF THE INVENTION**

- [3] There are many different known sun screen devices for use in vehicles. In particular, where there is a roof module having a transparent area (e.g., a glass sliding roof), sun screen devices are used to reduce the amount of sunlight that passes into the interior of the vehicle.
- [4] Recently, roof modules have been developed that have an especially large transparent area. These new roof modules usually have a panoramic windshield composed of a windshield area and a roof area that merge into one another without any intervening structure, such as a crossbar or frame. With this structure, it has been possible to realize an interior that is flooded with light and that has very good panoramic visibility. Nevertheless, a roof module of this type makes severe demands on the sun screen device because unimpeded sunshine passing into the interior of the vehicle would result in unpleasantly high temperatures in the interior.
- [5] There is a desire for a sun shade structure that can control entry of sunlight through a panoramic windshield.

### **SUMMARY OF THE INVENTION**

- [6] The invention is generally directed to a sun screen device that functions very flexibly to provide shade for the interior of the vehicle in the desired manner. According to one embodiment of the invention, the device includes at least one guideway which extends in the longitudinal direction from back to front, a housing that is mounted on the roof module, a first sun screen that can slide forward from the housing and is guided by the guideway, at

least one cassette mounted on the front edge of the first sun screen, and a second sun screen contained in the cassette. The first sun screen makes it possible to provide the desired degree of shade from the sunshine in the roof area of the panoramic windshield. Additionally, if desired, the second sun screen can be extended to make it possible to adjust the degree of shade to any specific requirements.

[7] In one embodiment, the first sun screen can be a roll-up shade that can be extended from the housing that is mounted on the roof module. The second sun screen can also be a roll-up shade that is pulled down along the windshield after the first sun screen has been pulled forward up to the area of the overlap between the roof area and the windshield area. In this context, the second sun screen can be operated in two parts so that the driver and the passenger can each individually adjust the second sun screen to shade his or her own side of the vehicle.

[8] In one embodiment, the cassette for the second sun screen can be mounted on the first sun screen in a hinged fashion so that it functions as a sun visor.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

[9] The invention is described below on the basis of various embodiments which are depicted in the attached drawings as follows:

[10] Figure 1 is a schematic side view depicting a roof module having a sun screen device mounted thereon, in a starting position;

[11] Figure 2 illustrates the assembly from Figure 1 in which a first sun screen is extended;

[12] Figure 3 illustrates the assembly from Figure 2 in which a second sun screen is partially extended;

[13] Figure 4 illustrates the assembly from Figure 2 in which a second sun screen is completely extended;

[14] Figure 5 illustrates an assembly according to a second embodiment in which a first sun screen is extended;

[15] Figure 6 illustrates the assembly from Figure 5 in which a second sun screen is unfolded; and

- [16] Figure 7 illustrates the assembly from Figure 6 in which a second sun screen is completely extended.

### **DETAILED DESCRIPTION OF THE EMBODIMENTS**

- [17] Figure 1 illustrates one embodiment of a roof module 10 that contains a rear roof area 12 and a panoramic windshield 14 constituting the front roof area. The panoramic windshield 14 can be made of glass or a suitable plastic and it has a roof area 16 which is joined to the rear roof area 12 as well as to a windshield area 18.
- [18] At the rear roof area 12, just before the beginning of the panoramic windshield 14, a housing 20 is disposed and contains a first sun screen 22. The first sun screen 22 is a roll-up shade which is taken up in the housing 20. A cassette 24 is disposed at the front edge of the roll-up sun screen 22 and extends transversely with respect to the longitudinal direction of the vehicle. The cassette 24 is guided on both sides by a guideway 26, which is configured as a guide rail in this embodiment. Both guide rails extend parallel to each other in the longitudinal direction of the vehicle along the side edges of the roof module, specifically from the housing 20 forward up to the transition from the roof area 16 of the panoramic windshield 14 to the windshield area 18. A second sun screen 28 is accommodated in the cassette 24 and is also configured as a roll-up sun screen in this embodiment.
- [19] In Figure 1, the sun screen device, which is made up of the first sun screen 22 and the second sun screen 28 in this embodiment, is depicted in the starting position in which the second sun screen 28 is completely taken up in the cassette 24 and the first sun screen 22 is completely taken up in the housing 20. The cassette 24 is therefore located outside of the light-transparent area of the roof module, the area being determined by the panoramic windshield.
- [20] Figure 2 shows a position of the sun screen device is depicted in which the cassette 24 is pulled forward up to the front end of the guideway 26. In this context, the first sun screen 22 is pulled out of the housing 20; it thus extends underneath the roof area 16 of the panoramic windshield 14 between the cassette 24 and the housing 20.
- [21] Figure 3 shows a position of the sun screen device in which the second sun screen 28 is partially pulled out of the cassette 24. The second sun screen 28 here functions as a sun visor.

- [22] Figure 4 illustrates a position in which the second sun screen 28 is completely pulled out of the cassette 24. The second sun screen 28 therefore extends along the windshield area 18 of the panoramic windshield 14 and is advantageously secured at the lower end of the windshield area 18. This position is especially appropriate when the vehicle is parked in the sun.
- [23] The cassette 24 can be made up of two partial segments so that separate second sun screens are provided for the driver and for the passenger. This makes it possible to provide shade for windshield area 18 in different ways.
- [24] Figures 5 through 7 illustrate a second embodiment of the inventive sun screen device. For the components that are known from the first embodiment, the same reference numerals will be used, and for them the above explanations are referenced.
- [25] The difference from the first embodiment lies in the fact that the cassette 24 in this embodiment is attached in a hinged manner on the front end of the first sun screen 22.
- [26] In Figure 5, the cassette 24 is shown as being folded back on the second sun screen 22. In Figure 6, it is evident that the cassette 24 can be folded out forward toward the windshield area 18. It functions as a sun visor as explained above. In Figure 7, it is evident that the second sun screen 28 can be pulled forward out of the cassette 24 to completely cover the windshield area 18.
- [27] In both embodiments, the cassette 24 and therefore the first sun screen 22 can be moved either manually or using an electrical drive device.
- [28] It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that the method and apparatus within the scope of these claims and their equivalents be covered thereby.